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ABSTRACT

This guide is an annotated listing of recent curricular materials dealing with some aspects of energy. A grade-subject matrix at the beginning of the guide directs the user to pages containing appropriate references for level and desired subject. A standard body of information is given for each guide entry. Materials are listed alphabetically by source, including the mailing address of the source, title, grade level, subject area, publication date, number of pages, price, and a brief abstract of the material. The collection includes 91 entries. (Author/RE)

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ENERGY EDUCATION RESOURCE GUIDE

SE 029 501

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Maryland State Department of Education
Division of Instruction
P.O. Box 8717, BWI Airport
Baltimore, MD 21240

Maryland Energy Office
301 West Preston Street
Baltimore, MD 21201

1980

ENERGY EDUCATION RESOURCE GUIDE

FOREWORD

THE energy crises of the 1970's present an energy challenge to Maryland schools for the 1980's. We must build an energy literate generation; one which understands the complex technological, economic, political, and social issues of the energy situation. Programs in science, social studies, mathematics, home economics, industrial arts, and vocational and environmental education must address the energy issue beginning in first grade and continuing through secondary school.

This *Energy Education Resource Guide* is designed as a starting point for teachers who wish to integrate energy education into existing curricular programs or develop new units and courses related exclusively to energy. The scope of the *Guide* has been narrowly defined: materials included are instructional units or activities. Individual entries include both student materials and teacher's guides.

The activities described in the individual units will involve teachers and students in investigations of the sources and uses of energy, political and economic questions related to development of alternative energy sources, and the role of individuals in energy conservation efforts. Readings, experiments, role-playing, discussions, and construction projects can raise the energy consciousness of our younger students and spur the research efforts of our advanced students. Many of the activities reinforce the reality of the energy crisis our students will face as adults and offer hope that they will play an important role in the solution of these problems.

This *Resource Guide* is one of the first projects of the energy education program jointly sponsored by the Maryland State Department of Education and the Maryland Energy Office. Future efforts will include development of teacher resource and instructional materials related specifically to energy in Maryland. The focus of these programs is on providing assistance to local school systems and individual teachers in development of energy education experiences for our students.

David W. Hornbeck
State Superintendent of Schools

ACKNOWLEDGMENTS

THE materials included in this *Guide* were selected from the variety of energy curriculum programs available. The sponsoring organizations wish to extend appreciation to the individuals whose evaluation of the materials assisted in compilation of this document. Preparation of the *Guide* was coordinated by Joseph R. Staub, Jr., Maryland State Department of Education Energy Education Specialist.

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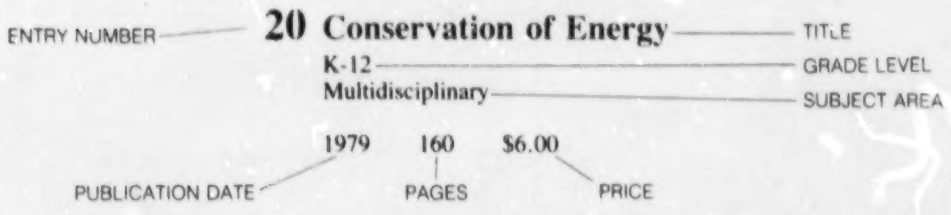
HOW TO USE THE GUIDE

THIS *Energy Education Resource Guide* is an annotated listing of many of the most recent curricular materials available which deal with some aspect of energy. The grade-subject matrix on the following pages was developed to help the classroom teacher identify appropriate level and subject material.

Each of the individual units included in the *Guide* is labeled with a number in the margin. The numbers in the matrix correspond to these numbers. A ninth grade science teacher can find materials in the matrix box under science and across from grade nine. The numbers in this box correspond to the instructional units listed in the *Guide* that deal with science topics at the ninth grade level. It may also be useful to consider those sources listed at the grade above and below the level you teach to provide a range of activities for the various ability levels in a class.

In addition, all teachers will be interested in those materials identified for K-12 and multidisciplinary levels. These materials generally include activity ideas which may be developed into lessons at any grade level, and they are often useful tools in organizing a conceptual framework for energy in the classroom. These sources are particularly useful for teachers in art, reading, and math classes—the activities can provide a focus on energy to fit these disciplines which are not traditionally areas where energy issues are taught.

A standard body of information is given for each *Guide* entry. Materials are listed alphabetically by source, including the organization's name and mailing address.



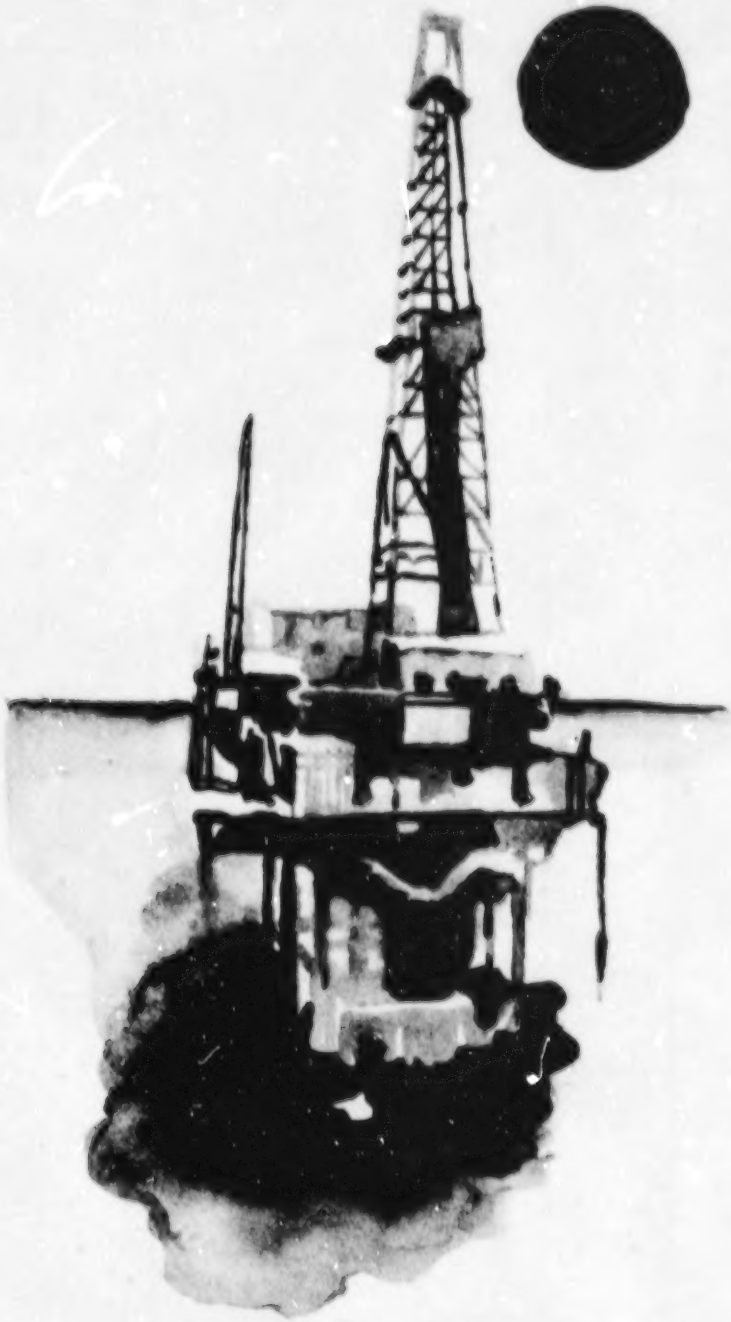
The primary objective of the *Guide* is to save time for teachers. While the gas and energy crises around us indicate a need to relate to energy education in our classrooms, the perplexing political and economic issues involved raise the question: "Where do I start?" The materials identified in the *Energy Education Resource Guide* provide an answer.

Joseph R. Staub, Jr.
Energy Education Specialist

GRADE-SUBJECT MATRIX

	SCIENCE	SOCIAL STUDIES	ENVIRONMENTAL EDUCATION	MATH	INDUSTRIAL ARTS
K	14, 30	30	30		
1	14, 27, 30, 42, 67	30	30, 42		
2	7, 14, 27, 30, 32, 67	7, 30, 38	30		
3	7, 14, 30, 32, 67	7, 30	30, 41		
4	7, 10, 15, 21, 30, 45, 67, 73	7, 15, 21, 30, 45, 68	30, 37	10	
5	3, 10, 15, 30, 45, 63, 64, 73	15, 30, 45, 57, 68	30, 57, 73	10	
6	4, 10, 15, 29, 30, 37, 47, 53, 59, 63, 64, 72, 73	9, 15, 30, 37, 47, 57, 59, 68, 72	4, 30, 57, 73	10, 47	
7	4, 10, 16, 25, 26, 29, 37, 47, 53, 55, 59, 62, 64, 65, 70, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 88	9, 16, 37, 47, 57, 59, 68, 69, 70, 72, 88	4, 55, 57, 73, 75, 76	10, 47	34
8	4, 8, 10, 16, 24, 25, 39, 53, 59, 65, 70, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 88	8, 9, 16, 39, 46, 57, 59, 68, 69, 70, 72, 88	4, 5, 7, 73, 75, 76	10, 44	34
9	4, 8, 10, 16, 24, 25, 29, 33, 39, 50, 54, 58, 59, 65, 70, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 88, 89	8, 16, 39, 40, 43, 46, 49, 50, 57, 59, 69, 70, 72, 88	4, 54, 57, 58, 73, 75, 76, 82	10, 23, 44, 82	34, 50, 90
10	1, 2, 4, 6, 8, 16, 17, 24, 33, 36, 50, 54, 58, 66, 70, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 88, 89	6, 8, 16, 36, 40, 43, 49, 50, 57, 69, 70, 88	4, 54, 57, 58, 73, 76, 82	23, 82	1, 2, 34, 50, 90
11	1, 2, 6, 8, 11, 17, 28, 33, 36, 48, 50, 58, 60, 66, 70, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 88	6, 8, 28, 36, 40, 43, 48, 49, 50, 69, 70, 88	58, 73, 75, 76, 82	82	1, 2, 34, 50, 91
12	1, 2, 6, 8, 11, 17, 28, 33, 36, 48, 50, 58, 60, 66, 70, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 88	6, 8, 28, 36, 48, 50, 70, 88	58, 73, 75, 76, 82	82	1, 2, 34, 50, 91
K-12	56		56		

	VOCATIONAL EDUCATION	READING/ LANGUAGE ARTS	HOME ECONOMICS	CONSUMER EDUCATION	ART	DRIVER EDUCATION	SPECIAL EDUCATION	MULTIDISCIPLINARY
		14			30			30
		14			30		32	30
		7, 14			7, 30		32	30
		7, 14			7, 30		32, 71	30
		7			7, 30		71	30
		57			30		71	30
		57			30		71	30
		57	80	80			71	84
		57	80, 83,	80			71	84
	89, 90	57	80, 83, 85	80, 85				84
	1, 2, 89, 90		36, 80, 83, 85	80, 85		87		84
	1, 2, 91		36, 80, 83, 85	80, 85		87		84
	1, 2, 91		36, 80, 83, 85	80, 85		87		84
			56					5, 12, 13, 18, 19, 20, 22 31, 35, 51, 52, 61, 68



American Association for Vocation Instructional Materials
Engineering Center
Athens, GA 30602

1 Electric Energy

10-12
Vocational Education, Industrial Arts, Science

1976	48 p. Text	$ 2.95
	155 Slides	$ 100.00

This publication is supplemented by an audiovisual kit containing 35 mm slides and tape cassette. The unit is designed to provide an introductory level understanding of electrical energy — how it is used, why it is important, how it works, where it comes from and how it is transported. Excellent graphs, charts, schematic diagrams are contained in the text and slides. Although the unit does not contain an evaluative tool or related student activities, it can be used as a student source for individual or group study.

2 Understanding Electricity and Electrical Terms

9-12
Vocational Education, Industrial Arts, Science

1975	48 p. Text	$ 3.95
	88 Slides	$ 44.00
	90 Masters	$ 7.95

This is a useful learning tool for the average homeowner as well as high school students. The unit consists of a well illustrated booklet, a set of slides, and originals for transparencies or student handouts. Excellent illustrations throughout; the reading describes electrical energy and how it works, defines common electrical terms and gives their relationships, and examines the use and conservation of electrical energy in the home. Activities and evaluative material are not included.

American Science and Engineering, Inc.
20 Overland Street
Boston, MA 02215

3 Energy Sources

5
Physical Science

1978

Teacher's Guide	142	$7.50
Spirit Master Booklet	33	$9.75
Activity Card Set	60	$13.50
Teacher's Kit		$42.00
Group Kit		$43.25

Energy Sources is one part of the SCIS II elementary science program. The key concept stressed throughout this 16-week unit is interaction. The complete teaching package includes a Teacher's Guide, Spirit Master Booklet, Activity Card Set, Teacher Kit, and Group Kit. Program components involve students in classroom and field investigations related to energy sources. Students are introduced to different examples of energy sources, chains, and receivers leading to the overall concept of energy transfer. The teacher's guide identifies learning objectives, materials, activity procedures, evaluation suggestions, and supplementary activities. The activity cards direct individual student inquiry in science, math, and language arts activities related to energy.

Boy Scouts of America
Scouting Division
North Brunswick, NJ 08902

4 Energy

John H. Woodburn, Ph.D.
6-10
Science, Environmental Education

1978 64 $.55

Although not a traditional school curriculum unit, this pamphlet can easily be adapted for classroom or outdoor instruction. A variety of learning activities are outlined in detail. Topics include Building a Solar Energy Box; What Is Energy?; Where Do We Get Energy?; How Is Energy Measured?; How Much Energy Is There in the World?; Could We Run Out?; and Conserving Energy. An energy glossary and bibliography are included. Excellent maps, tables, graphs, and photos are also included.

Center for Renewable Resources
1001 Connecticut Avenue, N.W.
Washington, DC 20036

5 Solar Energy Education Packet for Elementary and Secondary Students

K-12
Multidisciplinary

1979 59 $4.30

This unit is a compilation of readings, activities, and experiments related to solar energy. Background readings for teachers and secondary students describe some historical facts about solar energy use and describe how active and passive solar systems can be used today. Activities can be adapted to many grade levels. Topics explored include solar storage, designing a solar collector, the economics of solar energy, and wind and geothermal energy. A renewable energy glossary and bibliography are included. This unit provides a variety of practical suggestions for classroom teachers interested in including solar energy in their classwork.

Changing Times Education Service
E.M.C. Corporation
180 East Sixth Street
St. Paul, MN 55101

6 This Energy Crisis: Is It Real?

10-12
Social Studies, Science

1972 4 $12.00

This kit includes a teacher's guide, one transparency, "U.S. Energy Forecast," and 35 copies of the student reading, "This Energy Crisis —Is It Real?" This brief reading and guide are designed to generate open-ended inquiry and discussion into the nature of the energy crisis. The student reading examines past, present, and future sources of energy. Concepts to be developed during class discussion are identified; however, the source reading is dated.

Chevron, USA, Inc.
P.O. Box 3069
San Francisco, CA 94119

7 Save the Dinosaurs

2-4
Social Studies, Science, Reading, Writing, Art

1977 30 Single copy free

This unit consists of a teacher's guide, a set of picture and flash cards, and originals for student worksheets. The unit is designed to teach students about energy resources and the importance of energy conservation, beginning with the formation of fossil fuels during the time of the dinosaur. Games, puzzles, art activities, individual research, creative writing and vocabulary development activities are included. This unit is an excellent instructional tool at the elementary level.

Clemson University
c/o Dr. Harold E. Albert
College of Liberal Arts
Clemson, SC 29631

8 Putting "Energy" in Your Course: 1978

Harold E. Albert
8-12
Science, Social Studies

1978 182

This volume is a collection of 18 teaching units designed by the participants of the Energy Institute for Secondary Science and Social Studies at Clemson University held during the summer of 1978. The objectives of the institute were to provide an overview of past, present, and future energy problems and to stimulate teachers to use this information in their own courses. Topics include fossil fuels, energy conservation, nuclear power, coal mining, the economics of energy, and United States energy policy. Individual units include an introduction, instructional objectives, activities in a daily outline, and suggested resources. Implementation would require obtaining the materials identified in each individual unit.

Con-Stran Productions
River Park Building
3600 Conshohocken Avenue
Philadelphia, PA 19131

9 America's Maritime Heritage: Sail Power to Nuclear Power

William Ray Heitzmann
6-8
Social Studies

1977	Book I — 31	$2.50
	Book II — 33	$2.50

While the sub-title of these two books is "An Energy Education Activity Book," energy is approached as a part of maritime studies. The basic objective of the books is to develop some basic process skills (emphasizing reading, writing, critical thinking, mathematics, speaking, and interpersonal relations) through the activities. Energy-related activities include energy and the environment, sources of U.S. oil imports, hydroelectric power, water transportation and energy consumption, and energy and the maritime enterprise. An annotated bibliography of maritime periodicals, professional and instructional materials, naval and maritime museums, and energy education resources is included.

Council on the Environment of New York
51 Chambers Street, Room 228
New York, NY 10007

10 Energy Conservation Education: An Action Approach

Michael Zamm, Barry C. Samuel
4-9
Science, Math
1977 64 $1.50

This curriculum unit consists of 13 lessons, six spirit masters, and two wall charts. Emphasis is on student involvement in activities, especially home and school conservation of electricity. The curriculum is divided into four parts: Part I: Introduction to Energy: Types and sources of energy; the importance of conservation. Part II: Electricity Conservation in the Classroom: An action project designed to involve students in actually conserving electricity in the classroom on a daily basis. Part III: Expanding the Energy Circle: energy conservation in the school, home and neighborhood: energy-oriented walks and mapping exercises in the school building and neighborhood; also includes home energy conservation sheets for use by children and parents. Part IV: Enrichment Lessons: Lab experiments, biographies in energy, energy-related careers, reading and language arts exercises.

Crystal Productions
107 Pacific Avenue
Aspen, CO 81611

11 Solar Energy Laboratory Manual

W. Douglas Davis
11-12
Science

1979	Teacher's Guide	45	$5.95
	Lab Manual	95	$5.95

This unit consists of 17 laboratory and outdoor experiments which teach fundamentals about the collection, storage, and use of solar energy. Topics include suntracking, solar radiation, trapping the sun's energy, heat transfer, passive solar systems, and flat plate collectors. The activities contain objectives, a listing of equipment required, procedures, and exercises for follow-up. The teacher's guide provides an answer key and extensive tables for determining radiation values.

District of Columbia Public Schools
400 Maryland Avenue, S.W.
Washington, DC 20202

12 Energy: Past, Present

K-12
Multidisciplinary

1977 120

This comprehensive curriculum guide contains concepts, behavioral objectives, suggested activities, and some student resources. The guide is divided into five sections: Energy as a Concept, Sources of Energy, Alternative Sources of Energy, Conservation of Energy, and Implications. Although the structure of the unit is designed specifically to be incorporated into District of Columbia curriculum, it can easily be adapted or used as a model for other programs. A glossary and list of teacher references is included.

Dutchess County Board of Cooperative Educational Services
Route 1, Salt Point Turnpike
Poughkeepsie, NY 12601

13 Energy, Key to the Future

Wayne Mengel
K-12
Multidisciplinary

1974 48 $4.00

This guide was developed as a starting point for lesson plan development by teachers. Activities are presented as ideas centered around the following energy-related topics: conversion; production; social impact; political implications; geography; home, school and community use; and conservation. A glossary of terms and list of teacher resources is included. The guide provides an excellent starting point for teachers' writing lessons or for use as student learning activity packets.

Edison Foundation
143 Cambridge Office Plaza
18280 West Ten Mile Road
Southfield, MI 48075

14 A Century of Light: An Activity Program for Grades K-3

K-3
Science, Reading

1979 10 $2.00

The contributions of Thomas Edison are the focus of this unit which consists of a teacher's guide, six spirit masters, and a wall chart. Teaching objectives center on showing students the interaction of science and inventions and the impact of inventions on the way people live. Student activities are in the form of puzzles, vocabulary building, experiments, and readings. The wall chart describes the life of Edison as a youth and details the contributions of eight other inventors including Alexander Graham Bell, the Wright Brothers, and Jonas Salk.

15 A Century of Light: An Activity Program for Grades 4-6

4-6
Science, Social Studies

1979 10 $2.00

The unit focuses on the impact of technology in the lives of students and their families. Six spirit masters examine inventions made during the past 100 years, how inventors work, and inventors of today and tomorrow. The wall chart provides a time line of important inventions and some fun facts about inventors and their inventions. A teacher's guide gives background information and additional activity ideas.

16 A Century of Light: An Activity Program for the Upper Grades

7-10
Science, Social Studies

1979 10 $2.00

This unit extends many of the concepts explored in the elementary units. Student worksheets investigate a century of changing life styles as a result of inventions, how inventors work, and some scientific research which may lead to the inventions of tomorrow. The wall chart pictures a century of change through inventions. Background information, additional activities, and a brief list of additional resources are provided in the teacher's guide.

Educational Research Council of America
Rockefeller Building, 614 W. Superior
Cleveland, OH 44113

17 What's the Matter with Energy — Energy Sources

10-12
Science

1973 Teacher's Guide — 40 $2.05
Student Text — 50 $1.84

Part of the Educational Resource Council of America's Unified Science Program, this unit is designed as a mini-course or supplemental material for existing science classes. The basic format for the ten activities in reading, lab work, and discussion, and the activities are planned for both group and individual work. Content is drawn from physics, chemistry, biology, and earth science. While the unit was developed in 1973, the content remains appropriate, although an activity on the energy crisis will require up-to-date resources. Other topics covered include nuclear energy, geo-gravitational energy, combustion of fuels, and solar energy.

Energy and Man's Environment
0224 S.W. Hamilton
Suite 301
Portland, OR 97201

18 Energy and Conservation Education: Activities for the Classroom

1-12
Multidisciplinary

1977 400 $24.00 each

Each set of four lesson plan binders for grades 1-3, 4-6, 7-9, and 10-12, is divided into six energy topics: sources, uses, conversion, impacts, limits, and future sources. Objectives are clearly and simply stated. The activity/subject matrix lists each activity title and identifies the appropriate grade level, discipline, and approximate time required. Individual activities include a title, major concept to be developed, an objective, time, grade, subject matter, implementation strategies, and materials. The activities generate student involvement in "hands-on" experiments. An excellent "data bank" of ideas for teachers at every grade level and discipline for incorporating energy education into the classroom.

19 Energy Activity Guide

1-12
Multidisciplinary

1976 40 p., each title $25.00/set of seven

This seven-part series provides multidisciplinary activities in six topic areas: energy sources, uses, impacts, conversions, limits, and future sources. The introductory booklet provides a framework of goals, concepts and objectives. Each of the six issue booklets provides a variety of activities grouped by major concept and objective. Individual activities are presented in outline form; teachers may adapt and modify these ideas for inclusion into existing courses or use them as an idea bank for individualized student work.

20 Conservation of Energy

K-12
Multidisciplinary

1979 160 $6.00

The goal of this program is to help students at all levels understand and value practices which extend the useful life of the Earth's energy resources. Activity ideas are divided into eight concepts and identified by grade level. Topics include natural laws of energy conservation, attitudes, beliefs, and values which influence the practice of energy conservation; the affects on lifestyles and standard of living of energy-related decisions; and social and political decisions which influence the practice of energy conservation.

Energy Management Center
P.O. Box 190
Port Richey, FL 33568

21 Elementary Energy Education Program

4
Science, Social Studies

1978

The Elementary Energy Education Program was developed by the Pasco County Public Schools as a Title IV-C demonstration project. The program is a comprehensive nine-week module which includes both classroom and science center activities and experiences for students. Although the three instructional units may be adopted individually for classroom use, they are most effective in the context of the overall project. Components of the project include Energy Education for the Fourth Grade Classroom:

Information Packet (48 p.)

This booklet contains a project abstract and description, a listing of components of a delivery unit, sample materials, and steps for adaption of the project on an individual or multiple school basis.

Teacher Methods Book (108 p. $8.25)

The rationale and specific objectives, materials vocabulary, answer keys, additional learning activities, and evaluation materials are provided for each of the three teaching modules. Teacher background materials, readings on energy sources, an evaluation, knowledge and values instrument, and a teaching bibliography are also included.

Guide to Conducting Preservice Training (135 p. $8.25)

This guide is designed to provide a project Coordinator with the tools to conduct a two-day teacher training program for schools implementing the Elementary Energy Education Unit.

Industrial Arts Manual to the Construction of Miniaturized Alternative Energy Source Equipment (75 p. $12.00)

This guide provides a set of instructions, including blueprints, for construction of eight hardware units, including solar, wind, hydroturbine and electrical energy sources.

Student Module A: Let's Learn About Energy (54 p. $0.55)

In two learning activity packets (LAPs), containing fourteen activities, students learn about the nature of energy and its forms.

Student Module B: Nature's Energy (64 p. $0.65)

The eighteen activities in these two LAPs explore biological energy systems.

Student Module C: Man and Energy (52 p. $0.55)

The first LAP in this module (eight activities) focuses on electrical energy, while the second LAP explores alternative energy sources (five activities).

The ERIC Science, Mathematics and Environmental Education Clearinghouse
The Ohio State University
1200 Chambers Road
Columbus, OH 43212

22 Energy Activities for the Classroom

Herbert L. Coon, Michele Y. Alexander
K-12
Multidisciplinary

1976 148 $4.50

This unit is a collection of 110 energy activities organized by grade level (K-2, 4-6, 7-9, 10-12) and subject area. About one-half of the activities are science-related; the others include social studies, language arts, mathematics, home economics, and fine arts topics. Each activity includes a purpose, grade level and discipline designation, a major concept, and directions for the student activity. Materials and equipment needed are identified. Many of the activities are adapted from other sources, and a reference is provided. It may be difficult to obtain a number of the references since they are materials produced in Ohio. Since many of the activities are "hands-on" experiments, it may be easy for the classroom teacher to adapt and include these in existing programs.

Florida State Department of Education
Office of Environmental Education
Knott Building
Tallahassee, FL 32304

23 Computations About the Sources and Conservation of Energy

9-10
Mathematics

1976 74

Activities in this unit present a mathematical examination of energy concepts designed to give students a practical understanding of energy use and conservation. Word problems are grouped into three units: Energy for Moving Things, which examines energy use in transportation and recreation; Energy for Heat and Light, which looks at energy use and conservation in the home; and Our Energy Resources, which explores the many sources of energy. A comprehensive glossary, an answer key, table of conversion factors, and brief bibliography are included. This unit is an excellent starting place for teachers interested in providing students with insights into energy conservation from a mathematics perspective.

Ginn and Company
P.O. Box 573
Lexington, MA 02173

24 Household Energy

8-10
Science

1976	Teacher's Edition — 90	$3.95
	Student Edition — 75	$2.50

"Household Energy" is designed for use as a mini-unit or as individual lessons for inclusion in existing science courses. Eighteen activities are grouped as core, advanced, and excursion according to level of difficulty. Activities focus on various aspects of energy use in the home including energy costs, using energy, household appliances, cutting energy costs, and using solar energy at home. The teacher's edition includes a program overview, listing of materials and equipment required for each of the activities, background information, evaluation suggestions, and references.

Harcourt Brace Jovanovich
757 Third Avenue
New York, NY 10017

25 Energy: A Physical Science

Paul F. Brandwein
7-9
Science

1975	Student Text — 496	$9.00
	Teacher's Guide — 60	$2.50

This text approaches physical science concepts from an energy viewpoint. Topics include energy and matter; energy and force; thermal energy; and electric energy. Laboratory materials and experiments are integrated into the student text. This highly recommended course of study treats complex concepts in a form manageable for junior high science students. A revised edition will be available in January 1980.

Highline Public Schools
P.O. Box 66100
Seattle, WA 98166

26 Energy Futures

Donald Parr
7-9
Science

1978 55

Although designed for grade 7, the concepts and complex mathematics used in this unit make it appropriate for grades 8 and 9 as well. The unit is comprised of 11 activities designed to take two to three weeks to complete. Concepts developed in the unit include: 1. The development of energy takes many forms. 2. How much energy does the student and his family use? 3. How much energy does the school and community use? 4. Energy use in the United States. 5. Renewable energy sources. 6. Nonrenewable energy sources. 7. The conservation of energy. 8. Energy conversion in electrical generation. 9. The need for additional electrical power. 10. Conservation of energy. 11. Energy sources in the future. Each activity includes the concept, materials needed, procedures, evaluative activity, and suggested extra activities. Useful for the teacher looking for a ready-made unit.

Highline Public Schools
P.O. Box 66100
Seattle, WA 98166

27 Home Sweet Earth

Marie Meaney
1-2
Science
1978 38

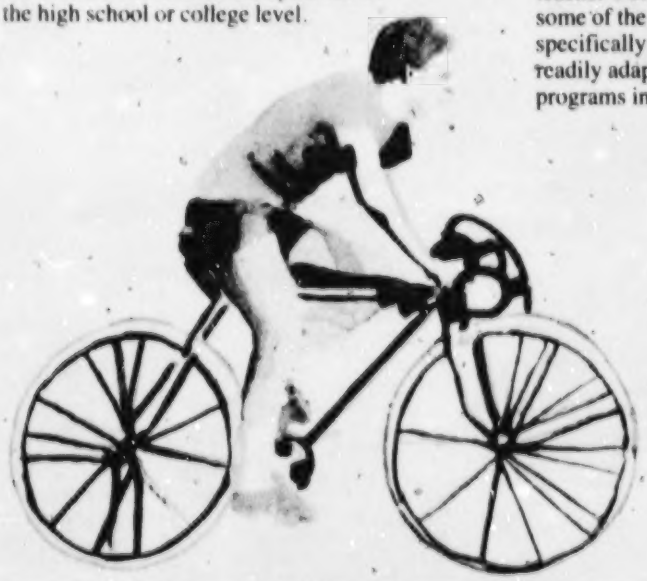
A good resource for primary teachers, this packet contains activities dealing with environmental concerns and energy conservation. Activities include chart con 'ruction, art work, music, stories and discussion. Some student resources are given, but teachers will have to create additional materials. Each of the ten lessons includes a basic concept idea, a list of materials needed, procedures to follow, and an evaluative activity.

Hubbard
P.O. Box 104
Northbrook, IL 60062

28 Energy and Society: Investigations in Decision-Making

11-12
Science, Contemporary Issues
1977 115 $85.00

A complete multi-media program, including study cards, an energy game, a film loop, set of 35 mm slides, a student handbook, and instructor's manual. Components may be purchased separately. *Energy and Society* is designed as a nine-week course, or it may be included as part of existing earth science, environmental education, geography or social studies classes. As part of the Biological Science Curriculum Study, it can be used at the high school or college level.



Instructor Curriculum Materials
7 Bank Street
Dansville, NY 14437

29 Energy and Matter

Stephen Kress and Richard M. Powell
6-9
Science
1975 21 $4.95

This unit consists of nine posters illustrating scientific concepts with do-it-yourself science experiments on the back. Concepts illustrate heat transfer, electricity, and energy conservation. A brief teacher's guide provides background information, ideas for using the posters, and suggested student readings.

Iowa Energy Policy Council
215 East 7th Street
Des Moines, IA 50319

30 Energy Conservation Activity Packets

K-6
Multidisciplinary

1977 50-60 $2.00 each

Each unit in this set of five multidisciplinary learning packets for grades K-2, 3, 4, 5, and 6 is a teacher resource centered around knowledge and personal awareness objectives. Brief activity descriptions are included for each objective. Activities include puzzles, plays, experiments, surveys, map reading, and construction projects. Transparency masters for student materials are included, along with annotated student and teacher's bibliographies at each level. Although some of the information and materials are related specifically to Iowa, these activities overall can be readily adapted for existing elementary curriculum programs in Maryland.

Kentucky Department of Education
Division of Program Development
Capital Plaza Tower Room 1809
Frankfort, KY 40601

31 Energy Conservation Activities for the Classroom

K-12
Multidisciplinary

1977 250

This unit consists of 86 learning activities, many of them adapted from other curriculum described in this volume (in particular, Energy and Man's Environment, National Science Teacher's Association and ERIC/SMEAC materials). Each activity includes the following information: a title, main concept and objective, appropriate subject area, grade level, approximate time, and the procedure. Originals of student resources are provided for reproduction. Teacher background material is provided in a brief introduction, "Where Does Energy Come From?" An energy education bibliography of resource organizations is included.

Lakeview School District
Energy Stewardship Program
RD #1
Stoneboro, PA 16153

32 Movement Is Energy

Sherry Guyton
1-3
Special Education, Science

1977 18

This mini-unit is designed to help students understand basic energy and some of its uses in everyday living. Ten activities include teaching objective, teacher background, a list of materials required, and directions for the activities. Student materials are provided in five masters for use as a student coloring book.

La-Salle — Peru Township High School
Jean Hauser, Project CREATION
541 Chartres Street
LaSalle, IL 61301

33 Project Creation: Energy

9-12
Science

1977 400 Free

Energy is one of four Project Creation courses designed to increase "concern regarding the environment and technology in our nation." Individual units include nuclear power, coal, solar power, gasoline, and electricity. Each activity handbook includes lesson plans containing objectives, materials and resources required, procedures, and recommended discussion questions. This Title IV program has been validated and is available for implementation through the National Diffusion Network. Contact: Dr. Raymond H. Hartjen, Maryland Facilitator Project, 317 East Charles Street, La Plata, Maryland 20677.

Minnesota Instructional Materials Center
3554 White Bear Avenue
White Bear Lake, MN 55110

34 Energy Activities for Industrial Education

7-12
Industrial Arts

1977 42 $5.00

Each of the 21 activities developed by teachers for industrial education programs identifies procedures and contains illustrated diagrams of equipment and materials required. Students are actively involved in "hands-on" experiments. Energy topics emphasized include construction of hydroelectric and wind generators, insulation efficiency tests, solar collection and storage, and automotive efficiency.

National Education Association
1201 Sixteenth Street, N.W.
Washington, DC 20036

35 Energy and Education: Teaching Alternatives

Frederick E. Posthuma
K-12
Multidisciplinary

1978 160 $5.95

This book is an excellent starting point for initiating an energy education program. In 15 chapters it provides a rationale and guidelines for energy programs, suggestions on developing energy teaching centers, background readings on energy issues, curriculum lesson and unit plans, and a resource list. "Which Source of Energy Is Best for Heating My Community" and "Energy and Its Natural Sources" are two curriculum units included. Topics covered in the background readings include teaching about the nuclear power controversy, six ways to reduce energy consumption, and leisure and the energy crisis.

National Science Teachers Association
1742 Connecticut Avenue, N.W.
Washington, DC 20009

Copies available free from:
U.S. Department of Energy
Technical Information Center
P.O. Box 62
Oak Ridge, TN 37830

36 Agriculture, Energy and Society

10-12
Social Studies, Home Economics, Science

1978 110 Free

This unit consists of 11 activities which focus on the energy component of food production. Individual activities examine agricultural careers, energy efficiency of producing different crops, the use of fertilizers in agriculture, and alternatives to conventional farming techniques. Student materials provide tables and graphs depicting energy consumption in food production, energy efficiency for common crops, and the effect of fertilizers on grain yields.

37 Bringing Energy to the People: Washington, D.C. and Ghana

6-7
Social Studies, Science

1979 90 Free

The six activities in this unit comprise a comparative cultural study of life in Washington, D.C. and life in Acera, Ghana. Activities present an overview of two basic energy concepts: (1) energy is a basic need in all cultures, and (2) energy use affects the way people live. Through a comparison of maps, tables, and graphs, students analyze the impact of energy on individual lifestyles. A short play compares and contrasts the uses of electricity in the two areas. Activities will take two to three weeks to complete.

38 Community Workers and the Energy They Use

2
Social Studies

1977 80 Free

Energy is important to the farmer, grocer, food processor, service station attendant, meter reader, truck driver, and electrician in different ways. Through a variety of stories, coloring, and construction activities, students explore the importance of energy to the people in each of these career areas.

39 Energy, Engines, and the Industrial Revolution

8-9
Science, Social Studies

1977 82 Free

This unit consists of five activities which examine the importance of energy in the industrial revolution, changes in people's lifestyles as a result of industrialization, and energy conversion in the automobile. Student resources include a reader, "Energy, Engines, and the Giant Step of the Industrial Revolution," a time line of industrial development, and maps and tables describing population shifts in England during the early industrial revolution (1750-1900). Length of unit will vary from 7 to 16 days.

40 Energy in the Global Marketplace

9, 10, 11
Social Studies

1978 58 Free

The six activities in this unit examine the global economics of the petroleum industry. Maps, tables, and graphs provide data on global supply and consumption, the relationship between oil and industrial development and the international balance of trade. A role-play simulation game investigates the process by which energy prices are determined. When used in its entirety, the activities will take two weeks to complete.

41 Energy and Transportation

3
Social Studies

1979 76 Free

Using classification activities, picture studies, and other developmental approaches, students learn about transportation in the neighborhood, community, and nation. The seven activities in this unit focus on the use of energy for public and private transportation, the production of fuels from crude oil, the pollution problems of urban areas, and changes in past and future modes of transportation.

42 The Energy We Use

1
Science, Environmental Education

1978 42 Free

The nine activities in this unit introduce the concept of energy which children use in their daily lives. Activities focus on what energy is; food as a source of energy; and energy in the form of light, heat, and motion. Students also examine the various sources of energy — solar, fossil fuels, wind, and water.

43 How a Bill Becomes a Law To Conserve Energy

9, 11, 12
Social Studies

1977 115 Free

The primary objective of the seven activities in this three to five week unit is to integrate facts and concepts about energy into the study of the process of making and applying a law. Activities include a pretest and attitude survey, a case study of the national 55 mph speed limit law, a role-play simulation of the pros and cons of the national speed limit, and an examination of savings (in lives and energy) as a result of this legislation.

44 Mathematics in Energy

8-9
Mathematics

1978 72 Free

Energy concepts can be introduced into mathematics classes by using examples which focus on energy. The seven activities in this unit provide practical problems involving the use of fractions, decimals, percents, tables, and graphs. Students work with energy statistics, compute energy conversions, and manipulate energy units such as BTUs, watts, and calories.

National Science Teachers Association
1742 Connecticut Avenue, N.W.
Washington, DC 20009

Copies available free from:
U.S. Department of Energy
Technical Information Center
P.O. Box 62
Oak Ridge, TN 37830

45 Networks: How Energy Links People, Goods and Services

4, 5
Social Studies, Science

1978 102 Free

Beginning with a simple electrical circuit consisting of a dry cell, wires, and a bulb, students explore larger energy networks. Activities examine measurement of home energy consumption, electricity distribution in the community, the problems of an electrical blackout, the type of fuels used to generate electricity throughout the United States, and the environmental impact of coal mining. Student resources include puzzles, maps showing energy resources, and diagrams of electrical generation using different energy sources.

46 Transportation and the City

8-9
Social Studies

1977 46 Free

This unit consists of four activities which focus on the role of the automobile in the evolution of today's urban and suburban communities. Length of the unit is approximately two weeks. Activities compare miles per gallon of different transportation modes, examine the changes in small towns which have occurred as a result of urbanization in America, and contrast the benefits of automobile transportation versus the problem it has created.

47 Two Energy Gulfs

6-7
Social Studies, Science, Math

1979 95 Free

This unit consists of five activities and a unit test designed to be completed in six to nine class periods. The two major concepts developed in the unit are the dependence of people on energy and the effect of energy on people's way of life. The activities are a comparative study of the Persian Gulf region and the Gulf of Mexico area. Students examine the methods by which oil on-shore and off-shore is discovered and extracted, and undertake quantitative studies of oil resources, the amounts of oil transported by super tankers, and the numbers of barrels of oil used each day by the United States. Student resources include maps, tables, photographs, readings and worksheets.

48 U.S. Energy Policy — Which Direction?

11-12
Social Studies, Science

1978 89 Free

Designed as a companion to "How a Bill Becomes a Law to Conserve Energy," this unit studies the role of the executive branch of government in formulating a national energy plan. Activities examine America's economic dependence on energy, the increasing reliance upon foreign oil to meet domestic demand, the advantages and disadvantages of increasing coal production, and the development of a national energy plan by the Carter Administration.

49 Western Coal: Boom or Bust?

9-11
Social Studies

1979 73 Free

The focus of this unit is on the changes accompanying increased coal production in the Western United States. Students examine the location of coal reserves and the growth of boom towns which correspond to increased strip mining. The effect on people's life-styles is also explored. Student materials include readings and resource maps of the coal-producing regions of the United States.

Nebraska Energy Office
Box 95085
Lincoln, NE 68509

50 BTUs: Basic Teaching Units on Energy

9-12
Science, Social Studies, Industrial Arts

1978 400 $10.00

These 14 units were developed by secondary teachers for inclusion in existing courses. Length of the units varies from five to 15 days. Each unit, although different in content, has the same basic organization structure: an abstract, the recommended level, the time required, the major teaching strategies, essential advance preparation, the goals and objectives, the daily lessons, recommended evaluation suggestions, a bibliography, and a supplement, if needed. Originals for duplication of student resources are provided. Keys to daily or unit evaluations are also included. Titles for the individual units are: Fueling Around; Physical Laws of Electrical Power Generation; Energy Conservation in the Home; Oil: Fuel of the Past; Yesterday, Today, and Tomorrow; Solar Energy in the Home; Gasohol; Conservation with the "Double Nickel" and Carpooling; Economics and Energy; Future Energy Technologies; No Energy; Energy Uses in Nebraska Agriculture; Am I the Way; and Petroleum in An Age of Scarcity.

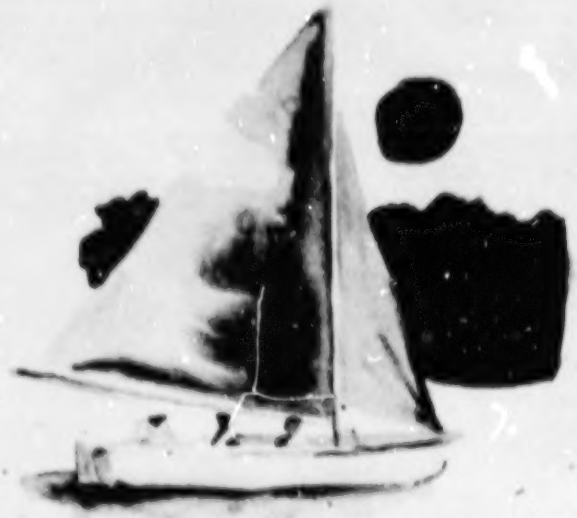
Ohio Department of Education
65 South Front Street
Room 801
Columbus, OH 43215

51 Energy: A Teacher's Introduction to Energy and Energy Conservation

K-12
Multidisciplinary

1975 86 $4.00

This unit was prepared specifically to provide background information on energy and energy conservation for elementary and secondary school teachers. The suggested Energy Conservation



Teaching Resource Units include activities, grouped by major concept and instructional objective. Activities are presented only in outline form and may be appropriate for grades 1 through 8. Although some of the specific data and tables are dated, this is an excellent tool for elementary teachers seeking an organized source of background information on energy.

Oklahoma State Department of Education
2500 North Lincoln Boulevard
Oklahoma City, OK 73105

52 Energy Awareness Education

K-12
Multidisciplinary

1977 293

This handbook is designed to provide teachers with the background material and information needed to include energy education in their curriculum area. It is divided into 11 chapters which include "A Definition of Energy," "The Energy Problem," "Selected Forms of Energy Used by Man," and "An Energy Conservation Ethic." A glossary and brief bibliography of teacher resources is included.

Pennsylvania Department of Education
Box 911
Harrisburg, PA 17126

53 Pennsylvania's Energy Curriculum for the Middle Grades

6-8
Science

1977 217

This unit is designed as a multidisciplinary resource guide for teachers in grades six through eight. Teacher materials include a bibliography, multi-media materials, and an attitude survey. Student activities are divided into six units: I. Energy: What Is It About; II. Energy: Where Does It Go; III. Energy: Its Present Sources; IV. Energy: Policy and Prospects; V. Energy: Is There Another Way?; VI. Energy: How Can I Help? Individual activities include a teaching objective and activity outline. Student resources are easily reproduced: Activities include puzzles, worksheets, lab experiments, and discussions. This unit can be easily adapted for student learning center or activity packet format.

Pollution Control Education Center
Union Public Schools
Union, NJ 07083

54 The Energy Challenge

9-10
Science, Environmental Education

1975 16 $2.50

These 12 activity cards examine energy use and conservation. Activities examine appliances, lighting and insulation in the home, and energy sources including petroleum, turbine engines, wind, geothermal and solar energy. The unit is practical for use as student activity packet or learning center for individual or small group instruction.

Project Clean
Shawnee Mission Public Schools
9803 Rosehill Road
Shawnee Mission, KS 66215

55 The Energy Problem

Hal Jehle
7th
Environmental Education, Science

1974 40

This two week mini-unit is part of the Cooperative Learning through Environmental Activities in Nature environmental eduction program. The unit contains an overview and test, background information for the teacher, instructional objectives and post tests, a resource list, and daily lesson plans. Each of the six lessons includes performance objectives, materials required, procedures, optional activities, and a copy of student materials. Topics include the nature of energy, energy sources, solutions to the energy crisis, and alternative energy sources.

Project Kare
McGinnis Office Building
Route No. 73 and Butler Pike
Blue Bell, PA 19422

56 A Curriculum Activities Guide to Electric Power Generation and the Environment

K-12
Environmental Education, Science, Home Economics

1975 140

This collection of 72 teacher-developed activities deal with energy and the consumer, energy and water pollution, and energy and air pollution. Individual activities provide an introduction, discussion questions, equipment and materials required for experiments, and procedures. Grade level recommendations for specific activities are not provided, but activities may be adapted to fit into existing curriculum programs. This Title IV program has been validated and is available for implementation through the National Diffusion Network. Contact: Dr. Raymond H. Hartjen, Maryland Facilitator Project, 317 East Charles Street, La Plata, Maryland 20677.

The Reading Laboratory, Inc.
P.O. Box 681
55 East Day Street
South Norwalk, CT 06854

57 Energy and Ecology: A Newsbook

5-10
Reading, Social Studies, Environmental Education
1976 44 $2.25

This student reading and activity booklet contains 11 reading selections and related exercises which explore the history, ramifications, and possible solutions of the energy/ecology dilemma. The overall unit objective is the development of basic reading skills through examination of important social, political, and economic issues. Students are asked to articulate the main theme of each article along with important supporting ideas; to differentiate between facts, assumptions, and opinions; and to recognize the point of view of the author. Reading seletions are short, edited versions of news feature articles with a readability level of fifth to sixth grade. New words are introduced and defined before each reading and reinforced by the activities which follow. Topics include Energy Makes the World Go Round; The Energy Crisis; Coal; Nuclear Power; Sun Power; and Energy From the Sea. A four-page instruction guide accompanies the student booklet.

Rodale Press
33 East Minor Street
Emmaus, PA 18049

58 Solar Energy Experiments for High School and College Students

Thomas W. Norton
9-12
General Science, Physics, Environmental Education

1977 129 $5.95

This multipurpose manual consists of 18 experiments and eight classroom activities. Experiments identify instructional objectives, teacher background information, materials required, procedures, computations, results, and discussion questions. Among the topics discussed are solar radiation characteristics, energy collection, air and water collections, and energy storage. These self-contained activities and experiments can be used in existing classroom programs, or designed as individual learning activity packets. The unit is well-illustrated and contains a variety of useful figures, tables, conversion scales, and suggestions for further reading.

Sadlier-Oxford
11 Park Place
New York, NY 10007

59 Energy

David D. LeMoine
6-9
Social Studies, Science

1978 64 $1.32

This unit is designed as a student workbook containing programmed readings, questions, and activities. The readings focus on energy sources including coal, atomic, hydroelectric, solar, oil shale, wind, geothermal and bio-mass. Instructional objectives for each of the chapters are presented in the form of pretest questions which are reviewed upon completion of the reading and activities. This unit is useful as an individual study program with activities focusing on vocabulary building, working with maps and diagrams, role-playing, and reading skills. Answer keys and a teacher's guide are not available.

W. B. Saunders Company
West Washington Square
Philadelphia, PA 19105

60 Energy in Life

11-12
Advanced Biology

1976	Student Text—138	$3.95
	Teacher's Guide—133	$3.95

This component unit from the Biological Sciences Curriculum Study Minicourse Development Project is designed as an introductory level college course but may be utilized with advanced high school students. The *Energy in Life* cluster consists of six individual mini-courses: The Nature of the Energy; Generating and Reviewing Energy; Stabilizing Energy — Photosynthesis; Preparing Energy for Use — Respiration; Utilizing Energy; and Human Energy Preception. The instructional kit consists of a student text and teacher's guide, and six audiotapes for student use. A copy of the audiotape script is provided in the teacher's guide. Student activities are laboratory oriented, requiring standard lab equipment as well as use of the audio tapes. Lession plans include instructional objectives, equipment and materials required, procedures, an answer key for student questions, and suggested evaluation items. This unit examines complex biological concepts related to energy and is appropriate to use with advanced students only.

Sears, Roebuck and Co.
Consumer Information Services
D/703 Sears Tower
Chicago, IL 60684

61 An Educator's Guide to the Three Es: Energy/Ecology/Economics

K-12
Multidisciplinary

1978	20	Free

This teacher's resource guide introduces concepts on energy, ecology, and economics, and the interaction among the three. The unit provides teacher background information, instructional objects, key concepts, a pretest, suggested interdisciplinary learning activities, and sources for additional information. Although activities are presented in brief outline form, this unit is a useful tool for teachers introducing energy concepts into their curriculum programs.

Shawnee Mission Public Schools
Project CLEAN
7235 Antioch
Shawnee Mission, KS 66204

62 The Energy Problem

7
Science

1976	40	$1.50

This unit is one of the modules developed for the overall K-12 Project CLEAN. The module contains an overview, objectives, daily lesson plans, tests and answer keys, and a resource list. The lessons start with directed reading followed by traditional activities such as discussion groups, mapping, and worksheets. The unit is designed to take about two weeks of class time.

Silver Burdett Company
250 James Street
Morristown, NJ 07960

63 Force/Work/Energy

George Katagiri, Doris Trojecak, Douglas Brown
5-6
Science

1976	Student Text—104	$2.40
	Teacher's Guide—112	$5.49

This unit, which consists of a student text and annoted teacher's guide, is part of the Self-Paced Investigations for Elementary Science series. The student text consists of 24 investigations, divided into six units. Each investigation includes readings and directions for conducting an experiment. Emphasis is on development of learning through utilization of the scientific method of inquiry. Individual topics include magnetic forces, gravity, potential energy, work, mechanical energy, and heat transfer.

The Solar-Ed Corporation
1627 Litchfield Turnpike
P.O. Drawer X
Woodbridge, CT 06525

64 Handbook of Energy Lessons Plans: Elementary Level

5-7
Science

1977 26 $3.00

This collection of seven solar energy experiments is designed for elementary science classes. However, the complexity of the subject matter and sophistication of the activities may be more appropriate for junior high students. Experiments include construction of a simple solar collector, measuring heat loss and containment, and heat conducting properties of various metals. The materials are designed for the teacher, and student materials are not included. Each experiment contains objectives, a list of required materials, procedures for introducing the concept, and study questions.

65 Handbook of Energy Lesson Plans: Junior High Level

7-9
Science

1977 23 $3.00

This collection of ten solar energy experiments expands many of the concepts developed in the *Elementary Level* materials. Topics include heat transfer, electrical generation by solar cells, testing absorber coatings and surfaces, and tracking the sun. Teacher materials include background information, procedures for conducting the experiments, suggested student questions, a list of required materials, and illustrations of the laboratory setup.

66 Handbook of Energy Lesson Plans: High School Level

10-12
Science, Mathematics

1977 25 $3.00

These 12 solar energy experiments expand on a variety of secondary science and mathematics concepts. Experiments examine the power output of a solar cell, the theory of photovoltaics, operating efficiency of solar collectors, and measuring air pollution with a light meter. Individual activities are well-suited for incorporation into learning activity packets or individual student lab work.

Solar Service Corporation
306 Cranford Road
Cherry Hill, NJ 08003

67 Tilly's Catch-A-Sunbeam Coloring Book

Tilly Spetgang
1-4
Science

1977 30 $1.50

This booklet overcomes the drawbacks of many coloring books by treating a sophisticated concept in a way that will be interesting to students at all grade levels, as well as to the teacher. Difficult vocabulary terms are broken down and explained while the concept of solar energy is expanded. A solar lesson plan describes five experiments students can do to reinforce the reading in the booklet.

Standard Oil Company, Indiana
Teaching Aids
P.O. Box 5910-A
Chicago, IL 60680

68 The Energy Crisis: What You Can Do About It

4-8
Social Studies

1978 8 $1.00

This unit consists of five spirit masters and a three-page teacher's guide which includes background information and instructions for the activities. Spirit masters contain student reading material and worksheets for activities. In the activity "Some Helpers We Have Today," students examine a list of appliances and identify ones which were available to their parents and grandparents when they were young adults. "Our Energy Sources" describes the major sources of energy used today. "You Can Save Energy" presents conservation tips for use in the home. "The Need for Oil" examines the products derived from crude oil. "Our Energy Future" explores alternative energy sources.

69 Living with Energy

7-11
Social Studies

1977 8 $1.00

This unit focuses on the role of energy in the lifestyle of Americans today. A comprehensive teacher's guide provides learning objectives and background information. Five spirit masters examine a variety of issues. "Energy and Your Lifestyle" starts with the students' own experiences and the way energy affects how they live. "Microtown, U.S.A." examines energy use in an imaginary city and explores options for planning for more efficient energy consumption in the future. "Finding Energy Solutions" examines alternative energy sources for meeting future needs.

State of Alaska
Department of Commerce and Economic Development
338 Denali Street
Anchorage, AK 99501

70 Energy Is Everywhere

Karen Seelhoff
7-12
Science, Social Studies

1975 74

This guide is a compilation of activities from other sources. Twenty-three student activities are grouped into units dealing with the conversion of energy, the history of energy use, energy conservation and energy for the future. A glossary of energy terms is included. The activities are loosely organized, with no conceptual framework or objectives given. Individual activities can be extracted and incorporated into existing science or social studies courses.

Topeka Public Schools
624 West 24
Topeka, KS 66611

71 Energy and You

3-8
Special Education

1978 50

This unit was developed for educable mentally handicapped special education classes. It provides a variety of activities divided into four topics: what is energy, energy fuels, how we use energy, and conservation of energy. Instructional objectives and a list of required materials are provided for the teacher. Student handouts can be reproduced from originals included.

Union Carbide Corporation
Corporate Communications Department
270 Park Avenue
New York, NY 10017

72 What Can You Make from Energy?

6-9
Science, Social Studies

1978 20 Free

This teaching packet includes a wall poster and activity booklet. The poster provides a "Technology Time Line" and graphic display of "What Do We Make from Energy?" The activity booklet includes a teacher's guide with objectives, instructions for using the student activities, and suggestions for extending activities. Student worksheets are included on twelve spirit masters. Readings, charts, map exercises and surveys address topics such as: How Do We Use Energy?, Sources and Resources, Energy Alternatives, and Petrochemical Products in Your Life. Answer keys and a brief glossary are provided.

U.S. Department of Energy
Office of Education, Business and Labor Affairs
Washington, DC 20585

Materials available from:
U.S. Department of Energy
Technical Information Center
P.O. Box 62
Oak Ridge, TN 37830

73 Science Activities in Energy

4-12
Science, Environmental Education

1979 35 pages each Free

This program consists of six folders which concentrate on chemical, electrical, wind and solar energy, and energy conservation. Each folder consists of 12 to 16 individual hands-on activities which are practical for classroom and community programs. Each project is introduced as a question; directions lead the student inquiry to solve the problem. Materials required for activities are readily available in the classroom or at home. A teacher supplement provides background information and an explanation of each of the experiments.

U.S. Department of Energy
Washington, DC 20545

Available from
U.S. Government Printing Office
Washington, DC 20402

74 Solar Energy Project Teacher's Guide

Teacher's Manual
Science

1979 36 $2.20

The Teacher's Guide provides an overview of the eight components that comprise the Solar Energy Project. A brief description of the 43 individual activities is presented in the order these are contained in the five subject area packets. A content-grade level matrix and topical development outline present alternative ways for incorporating the activities into existing curriculum programs. Activities within the multidisciplinary extensions section suggest ways to apply the concepts, methods and materials to fine arts, agriculture, health, home economics, industrial arts, language arts, mathematics, and social studies courses. A hardware section provides diagrams and descriptions for construction of solar instruments including a still, thermometer, hot dog cooker, solarmeter, and solar clinometer. A References and Resources section identifies books, magazine articles, and organizations which provide information on solar energy.

75 Solar Energy Project Reader

7-12
Science

1979 108 $2.75

This section of the solar energy curriculum is designed to give both students and teachers an opportunity to review a variety of representative articles on solar energy. Consideration is given to the sun's role in man's past, present, and future — from the ancient worship of "Helios" to the production of electricity by photovoltaic conversion. The present state of solar technology is examined theoretically, economically, and comparatively in light of the growing need for alternatives in a world of diminishing energy supplies.

U.S. Department of Energy
Washington, DC 20545

76 Solar Energy Project: Junior High Science Activities

7-9
Science

1979 112 $2.75

This first activity guide presents the general lesson plan format for all of the solar activities. Student activity sheets include an introduction, behavorial objectives, skills and knowledge needed, materials required, procedures, questions, and suggestions for extending the activity. The teacher information sheet for each activity identifies suggested grade level and discipline, background information, hints on gathering materials, time requirements, suggested teaching approach, results of the experiment, precautions, modifications, evaluation and references. The 14 activities in this unit involve constructing simple solar collectors and measuring devices; exploring absorption, reflection, and transmission properities of different materials; examining insulation properities of different materials; constructing a simple solar water heater.

77 Solar Energy Project: Earth Science Activities

7-12
Earth Science, Physical Science

1979 86 $2.75

The 11 experiments in this unit involve students in construction of a radiometer and solarmeter to measure solar radiation. Other activities examine the greenhouse effect and measure the intensity of radiation at various times of the day. Teacher background information includes tables and graphs presenting potential readings and experimental results.

78 Solar Energy Project: Biology Activities

7-12
Biology

1979 33 $1.70

The four experiments in this unit focus on generation of energy through biomass conversion. Students measure the heat potential of various types of plants, firewood, and waste products. An estimate of the amount of land that a family would need to grow its own energy in the form of biomass is calculated.

79 Solar Energy Project: Chemistry and Physics

7-12
Chemistry, Physics

1979 55 $2.20

Experiments in this unit compare solar plate collectors and measure the intensity of solar energy. Students calculate the number of 100 watt bulbs required to simulate sunlight and construct thermocouples to measure solar energy. Teacher background materials offer suggestions for utilizing the activities in existing curricular units.

80 Solar Energy Project: General Solar Topics

7-12
Science, Home Economics, Consumer Education

1979 75 $2.50

The seven experiments in this unit examine a variety of solar topics and may be adapted for use in a number of high school courses. Students examine the design of a passive solar house, identify career opportunities in solar energy fields, explore home energy consumption, and design a computer program to track the sun. A collection of solar puzzles is also provided.

81 Solar Energy Project Text

Teacher material
Science

1979 102 $2.75

This unit is a compilation of 20 readings designed to provide teachers with technical information in the solar area. Topics include energy production in the sun, heat transfer, measurement of insolation, space heating, electrical production, biomass conversion, and economic and legal considerations of solar energy.

University of Colorado
School of Engineering
Boulder, CO 80309

82 Energy and Energy Conservation Activities for High School Students

9-12
Physical Science, Environmental Education, Math

1978 230

This manual contains 15 detailed energy and energy conservation activities designed specifically to challenge the above average high school student with an interest in science. Most of the activities are analytical or empirical and require a second year high school algebra capability. Among the topics included are thermocouples, heat content of fuels, wind machines, solar geometry, insulating characteristics of various materials, and passive solar design. Individual activities provide background data, time requirements, materials, suggested procedures, follow-up activities, and references. Fifteen appendices provide useful data and conversion information as well as a general and a solar glossary.

The University of Tennessee
Environment Center
South Stadium Hall
Knoxville, TN 37916

83 Energy Conservation in the Home

8-12
Home Economics

1977 320 Free

This unit provides a variety of resources which can be used by both teacher and students in home economics classes. Background readings clarify the relationship between energy use and conservation in housing construction, environmental control, food, clothing, personal care and entertainment. Twenty-six activities are included; each is referenced to the resource readings. A single copy of the unit may be obtained from the U.S. Department of Energy, Technical Information Center, P.O. Box 62, Oak Ridge, Tennessee 37830.

84 Ideas and Activities for Teaching Energy Conservation

7-12
Multidisciplinary

1977 225 Free

This unit is a comprehensive source of background information and activity ideas for all junior and senior high teachers. Four major sections examine the development of U.S. energy lifestyles and the energy crisis of the 1970s; explain in manageable terms renewable and non-renewable energy sources; explore the role of the teacher and school in developing a conservation ethic; and present an extensive idea bank of student activities divided by grade level and discipline including science, social studies, communications/language arts, and multidisciplinary. Appendices are energy conversion tables, a student glossary, and a bibliography.

The University of Wisconsin
Sea Grant Communications Office
1800 University Avenue
Madison, WI 53706

85 The Household Energy Game

Thomas W. Smith, John Jenkins
9-12
Home Economics, Consumer Economics, Adult Education

1974 20 $3.00

The Household Energy Game examines the current energy consumption patterns of individuals and explores ways to conserve energy. Energy spending for transportation, home heating and cooling, and appliances are identified and calculated, producing a household energy budget. Energy savings methods in each of the categories are described and estimates of potential savings calculated. Presented with a plan of action for home energy savings, participants are encouraged to implement an individual program which will save energy and money.

Washington State Department of Education
Office of Environmental Education
Old Capitol Building
Olympia, WA 98504

86 Energy Food and You

K-12
Multidisciplinary

1977 292 $5.00

This K-12 program consists of two units designed for use at the primary intermediate level (K-6) and secondary level (7-12). Individual activities are grouped around concepts which relate energy and food from an individual to a global perspective. Activities are cross-referenced by subject and grade level. Each activity includes learning objectives, materials needed, procedures, and a brief bibliography. Concepts addressed include renewable and non-renewable energy sources, environmental costs of energy production, energy efficiency and food production, and energy-efficient alternatives.

87 I Love My Car: Fuel Conservation Unit for Traffic Safety Education

10-12
Drivers Education

1978 70

This unit examines the role of the individual automobile driver in conserving energy used for transportation. Activities are grouped into three sections: Fuel Conservation Skills, Practical Activities and Values Classification, and Fuel Conservation Issues. A variety of classroom and in-car activities are provided. Student materials include readings, mileage computations, values clarification activities and discussion questions. The numerous tables and graphs may be useful for science and social studies classroom programs.

J. Weston Walch, Publisher
Box 658
Portland, ME 04104

88 Energy

Stephen S. Lowell
7-12
Science, Social Studies

1978 64 $3.25

This booklet is an excellent reader for junior or senior high students in general science, physics, government or geography classes. Complex concepts are addressed on a level students will be able to grasp. The text is divided into seven chapters: Energy: A Concept in Search of Definition; Energy: Growth of a Problem; Energy: Are We Really Faced with a Shortage?; Difficulties Stemming from an Energy Shortage; The Energy Problem: Short-Range Solutions; The Energy Problem: Long-Range Solutions. Each chapter is followed by a set of suggested discussion questions. Readings may be used individually or developed into a complete unit by supplementing with student activities.

Wisconsin Vocational Studies Center
1025 West Johnson Street
University of Wisconsin — Madison
Madison, WI 53706

89 Energy and Your Future

Robert E. King
9-10
Science, Vocational Education

1978 40 $3.00

This booklet is a collection of nine experiments designed as a two week mini-unit. Topics include energy and its uses, energy consumption, changing energy forms, making electricity, and the economics of energy production. Activities contain teacher background information, procedures, and discussion questions.

Wisconsin Vocational Studies Center
1025 West Johnson Street
University of Wisconsin — Madison
Madison, WI 53706

90 Introduction to Energy

Fred Posthuma
9-10
Vocational Education, Industrial Arts

1978 114 $6.50

These 23 activities are designed as an introduction to energy, its uses and conservation. Activities are presented in outline form and grouped by behavioral objectives. Activity masters are provided for reproduction of student readings and worksheets. Many of these resources are adapted from Department of Energy materials. Topics include present resources, energy conservation, and alternative energy sources.

91 Understanding Solar Energy Systems

Laurie Keaton, Everett Edington
11-12
Industrial Arts, Vocational Education, Adult Education

1978 151 $7.00

This module was designed as a general introduction to solar energy, with specific comprehensive units focusing on residential applications and use of solar energy. A teacher's guide includes objectives, student readings, assignments and worksheets, test questions and keys, references and a brief glossary. A well-illustrated set of originals is provided for transparencies or student handouts. Topics covered include using solar energy; solar energy systems; collection, storage and distribution; and representative solar energy systems for heating homes.

ADDITIONAL MATERIALS

SOURCE _____
ADDRESS _____
TITLE _____

AUTHOR _____

GRADE _____ SUBJECT _____
DATE _____ PAGES _____ COST _____
COMMENTS:

ADDITIONAL MATERIALS

SOURCE _____
ADDRESS _____
TITLE _____

AUTHOR _____

GRADE _____ SUBJECT _____
DATE _____ PAGES _____ COST _____
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